|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Unit 2: Cells & Cell Processes** | | | | | | | |
| Name: | | Start Date: | | | 10/31/16 |  |  |  |
|  | | Test 3 Date: | | | 11/21/16 |  |  |  |
| Period: (Honors) | | Teacher: Ms. J | | | |  |  |  |
|  | |  |  |  |  |  |  |  |
| **Cells** | | Submitted | Resubmit | Correct | Evidence of Learning | Page # | Date | Sign-Off |
| **Objective 8:** Explain how homeostasis is maintained in a cell and within an organism in various environments. | |  |  |  | Homework: Cell Membrane WS |  |  |  |
|  |  |  | Catalyst: Latin Roots |  |  |
|  |  |  | Notes: Cell Transport |  |  |
|  |  |  | POGIL: Cell Transport |  |  |
|  |  |  | Catalyst: Cell Transport Review |  |  |
|  |  |  | Lab: Elodea Hyper/Hypo/Iso |  |  |

**Unit 2: Cells & Cell Processes**

**Objective 6:** Compare prokaryotic and eukaryotic cells in terms of their general structures (plasma membrane and genetic material) and degree of complexity.

*Essential Question:* How do prokaryotes and eukaryotes differ?

*“I Can” Statements:*

* Compare and contrast prokaryotes and eukaryotes

**Objective 7:** Summarize the structure and function of organelles in eukaryotic cells (including the nucleus, plasma membrane, cell wall, mitochondria, vacuoles, chloroplasts, and ribosomes) and ways that these organelles interact with each other to perform the function of the cell.

*Essential Question:* What are the main organelles (nucleus, plasma membrane, cell wall, mitochondria, vacuoles, chloroplasts, and ribosomes) and their functions?

*“I Can” Statements:*

* Identify the structure and function of organelles
* Explain the interactions of organelles (e.g. nucleolus 🡪 ribosome 🡪 ER 🡪 Golgi)
* Use a compound light microscope

**Objective 8:**  Explain how homeostasis is maintained in a cell and within an organism in various environments (including temperature and pH).

*Essential Question:* How do cells maintain homeostasis?

*Essential Question:* How do organisms maintain homeostasis?

*“I Can” Statements:*

* Model the way a plasma membrane functions to control the way particles move in/out of a cell
* Predict the movement of water and/or solutes across the cell membrane, given a set of conditions
* Explain how energy is used to maintain homeostasis

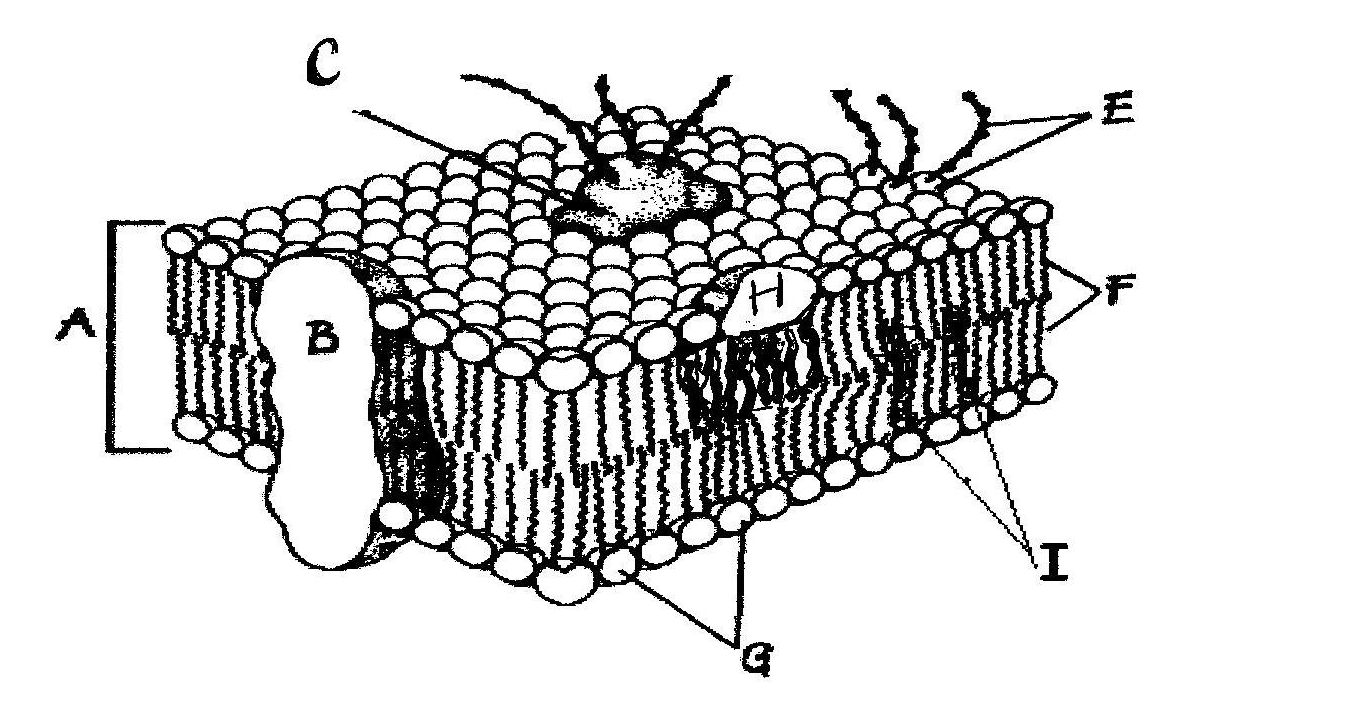
## Catalyst 1: Latin Roots

Define the following terms according to their Latin roots:

## Iso/ton/ic-

* Hypo/ton/ic-
* Hype/ton/ic-

## Biology I (Honors) Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Notes: Intra & Inter-cellular Transport Period: \_\_\_\_ Date: \_\_\_/\_\_\_/\_\_\_ \_\_

A- E-

B- F-

C- G-

D- H-

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_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## Biology I (Honors) Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Catalyst 2: Intro to Cell Transport Period: \_\_\_\_ Date: \_\_\_/\_\_\_/\_\_\_

**Objective 8:** Explain how homeostasis is maintained in a cell and within an organism in various environments.

1. The diagrams below represent cells in three different situations. The ovals represent the cells. The diamonds represent nutrient molecules dissolved in the cytoplasm within the cell or the fluid outside of the cell. Use these cells to answer the questions that follow.

|  |  |  |
| --- | --- | --- |
| **A.** | **B.** | **C.** |

**A.** In diagram A, are the nutrient molecules more likely to move into or out of the cell? \_\_\_\_\_\_\_\_\_\_\_\_\_ Why?

**B.** In diagram B, are the nutrient molecules more likely to move into or out of the cell? \_\_\_\_\_\_\_\_\_\_\_\_\_ Why?

**C.** In which situation would *water* be more likely to move into the cell? \_\_\_\_\_\_\_\_\_\_\_\_\_ Why?

1. What does it mean for a membrane to be selectively permeable?
2. Why is maintaining homeostasis necessary for the survival of a cell?

Biology I (Honors) Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lab: Elodea Period: \_\_\_\_\_ Date: \_\_\_/\_\_\_/\_\_\_

**Objective 8:** Explain how homeostasis is maintained in a cell and within an organism in various environments.

**Materials**

* 6% salt solution
* Coverslips
* Deionized water
* *Elodea*
* Medicine dropper
* Microscope
* Microscope slides
* Tap water

1. **Purpose:**

The purpose of this lab is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Procedure:**
2. Prepare a wet mount of *Elodea* leaf in tap water (the water that the *Elodea* is in).
3. Observe the leaf under low and then high power of your microscope. Locate a single cell along the plant edge. Observe the location of the chloroplasts in relation to the cell wall.
4. Diagram in the space below a **single** *Elodea* cell. **Label** the cell wall and chloroplasts.
5. Prepare a wet mount of *Elodea* leaf in 6% salt solution.
6. Observe the leaf under low and then high power of your microscope. Locate a single cell along the plant edge. Observe the location of the chloroplasts in relation to the cell wall.
7. Diagram in the space below a **single** *Elodea* cell. **Label** the cell wall, cell membrane, and chloroplasts.
8. Prepare a wet mount of *Elodea* leaf in deionized water.
9. Observe the leaf under low and then high power of your microscope. Locate a single cell along the plant edge. Observe the location of the chloroplasts in relation to the cell wall.
10. Diagram in the space below a **single** *Elodea* cell. **Label** the cell wall and chloroplasts.
11. Answer the analysis questions.
12. **Hypothesis/Independent and Dependent Variables**
    1. Formulate a hypothesis using IF, THEN and BECAUSE statement.  
         
       IF *Elodea* cells are put into tap water, THEN \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ BECAUSE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
         
       IF *Elodea* cells are put into salt water, THEN \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ BECAUSE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
         
       IF *Elodea* cells are put into deionized water, THEN \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
       BECAUSE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    2. What is the dependent variable in this lab? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    3. What is the independent variable in this lab? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. **Data:**

|  |  |  |
| --- | --- | --- |
| *Elodea* in tap water | *Elodea* in salt water | *Elodea* in deionized water |
|  |  |  |

1. **Analysis Questions**

Read the following statements before answering the questions:

1. *Elodea* cells normally contain 1% salt and 99% water on the inside.
2. Tap water contains 1% salt and 99% water.
3. Salt water contains 6% salt and 94% water.
4. Deionized water contains 0% salt and 100% water.

|  |  |  |  |
| --- | --- | --- | --- |
|  | ***Elodea* in tap water** | ***Elodea* in salt water** | ***Elodea* in deionized H2O** |
| 1. Describe the location of chloroplasts in each of these cells |  |  |  |
| 1. What is the percentage of water outside the cell? |  |  |  |
| 1. What is the percentage of water inside the cell? |  |  |  |
| 1. Has the inside of the cell changed its shape due to water loss or gain? (yes or no) |  |  |  |
| 1. If yes, has it gained or lost water? |  |  |  |

1. Will water move across the cell’s membrane if water percentages inside and outside of the cell differ? \_\_\_\_\_\_\_\_\_\_
2. In what direction should water move (from high to low **or** low to high percentage)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is plasmolysis? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. How can plasmolysis be prevented in a cell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. **Discussion/ Conclusion**

Discuss your findings according to the following criteria:

* Accurately and concisely summarizes data. Describes any trends or patterns (or lack thereof)
* Discusses relationship between the results and the hypothesis and the background information on which the hypothesis was based
* Compares and evaluates obtained data
* Possible and known sources of errors explained and substantial improvements suggested

Lastly, write a conclusion summarizing the various concepts learned in this lab. Your conclusion should start by restating the purpose of the lab. It should also summarize your observations explaining why water moves across a cell membrane and the effect this has on the cell. Finally, your conclusion should discuss the term plasmolysis and how plasmolysis can be prevented. Include several sources of error or problems that arose while completing this lab.

**\* Your formal lab write-up will be graded according to the criteria in the rubric attached. To receive full credit you must include all aspects of the rubrics!\***

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Topic: Cell Transport Score: \_\_\_\_\_\_\_/100

**Lab Report Rubric Reports must be typed and printed.** *Due at beginning of class on due date. Each day late = minus one letter grade*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Exemplary (10-9) | Accomplished (8-6) | Developing (5-4) | Beginning (3-0) |
| **Informative & Catchy Title** | Title clearly explains the specific purpose of the investigation while grabbing the reader’s attention | Title explains the specific purpose of the investigation | Title gives some indication of purpose of the investigation | Title mentions some part of the investigation |
| **Introduction** | * Includes purpose of investigation which clearly links to title * Provides accurate and extensive background information which helps reader understand key points of investigation * Accurately describes all variables, constants, and control group(s) of lab * Includes specific methods to minimize risks | * Includes purpose of investigation which links to title * Provides accurate background information which helps reader understand key points of investigation * Describes the variables, constants, and control group(s) of lab * Includes methods to minimize risks | * Includes purpose of investigation * Provides some background information * Mention of variables, constants, and control group(s) of lab * Statements regarding risks | * Mentions investigation * Isolated statements surrounding background information |
| **Materials** | ALL materials and quantities of materials listed | Some materials and quantities of materials listed | Most materials listed | Some materials listed |
| **Procedure** | Step-by-step instructions written clearly **and** concisely  Pictures of set-up | Step-by-step instructions written clearly **or** concisely | Step-by-step instructions written | Some statements regarding instructions |
| **Data** | * Quantitative and qualitative data included * Labelled pictures of results |  |  |  |
| **Discussion** | * Accurately and concisely summarizes data. Describes any trends or patterns (or lack thereof) * Discusses relationship between the results and the hypothesis and the background information on which the hypothesis was based * Compares and evaluates obtained data * Possible and known sources of errors explained and substantial improvements suggested | * Summarizes data. Describes any trends or patterns (or lack thereof) * Discusses relationship between the results obtained and the hypotheses * Compares data * Known sources of errors explained | * Summarizes data. * Discusses relationship between the results obtained and the hypotheses * Known sources of errors explained | * Summarizes data |
| **Real-world application** | * Clearly and accurately connects what was done and observed in the lab to a real-world example, ex. crime, paternity testing, testing for genetic disease, etc. |  |  |  |
| **Question(s)** for further investigation | Provides a new experimental question(s) based on this investigation | Provides a new question based on the investigation | Provides a question based on the investigation | Provides a question |
| **Grammar, punctuation, spelling** | * All written in past tense and passive voice * All grammar, punctuation, capitalization, spelling is correct. Subscripts/superscripts used properly (ex. CO2 - not CO2) | * Mostly written in past tense and passive voice * Most grammar, punctuation, capitalization, spelling is correct | * Some written in past tense and passive voice * Some grammar, punctuation, etc. is correct | * Little written in past tense and passive voice * Little grammar, etc., is correct |
| **Formatting and Works Cited** | * Entire document is MLA formatted. * ALL sources cited. Any class handouts used must be included. Wikipedia cannot be the only sources – need credible sources, too. | * Most of document is MLA formatted. * Sources cited, including class handout. Wikipedia cannot be the only sources – need a credible sources, too. | * Some of document is   MLA formatted.   * Sources cited | * Some sources cited |

Beyoncé. "Pray You Catch Me." *Lemonade,*Parkwood Entertainment, 2016, www.beyonce.com/album/lemonade-visual-album/.